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Based upon a systems analysis approach, a four-stage evaluation model called CIPP (context, input, process, product) assesses innovative programs in education. The model is both a way of viewing planned educational change and a decision making tool for the administrator within the local education agency. Development of the model includes a method for organizing relevant factors of the total information flow, a procedure for identifying program deficiencies, and an extensive outline of evaluative criteria. (JK)

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EVALUATION OF PLANNED EDUCATIONAL CHANGE AT THE LOCAL EDUCATION AGENCY LEVEL

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EVALUATION CENTER
THE OHIO STATE UNIVERSITY
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The EVALUATION CENTER, an agency of the College of Education, is committed to advancing the science and practice of educational evaluation. More specifically, the purpose of the Center is to increase education's capability to obtain and use information for planning, programming, implementing and evolving educational activities. To serve this purpose, the Center's interdisciplinary team engages in research, development, instruction, leadership and service activities.

HISTORY

The origin of the present Center traces back to the establishment of the Ohio State University Test Development Center in 1962. Due to the urgent need for a more comprehensive approach to evaluation than that afforded by standardized testing, the Test Development Center was expanded in 1965 into the present Evaluation Center which is concerned with many modes of evaluation in addition to standardized testing. However, test development remains an important part of the Evaluation Center program.

GOALS

The broad objectives of the currently constituted Center are:

to increase scientific knowledge of educational evaluation and planning;
to develop evaluation strategies and designs;
to develop evaluation methods and materials;
to provide instruction in evaluation;
to disseminate information related to educational evaluation;
to assist educationists in evaluating their programs.

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ORGANIZATION

To serve its complex objectives, the Center has developed an interdisciplinary team. Currently, the staff of the Center consists of fifty-four members, including five professorial positions, plus a varying number of visiting faculty. The staff and visiting professors bring expertise from the fields of economics, education (administration, curriculum and supervision, elementary and secondary school teaching, evaluation, mathematics, planning, research methodology, and tests and measurement), psychology, sociology, systems analysis, and urban planning. The Center is organized into four divisions: Administration and Program Development; Leadership in Evaluation; Research in Evaluation; and Test Development. The Center is administered by a director and an associate director for each division.

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EVALUATION OF PLANNED EDUCATIONAL CHANGE AT THE LOCAL EDUCATION AGENCY LEVEL

The advent of planned change in education, with unprecedented support through the expenditure of millions of additional dollars, has brought about not only a need, but a legal requirement for evaluation. In return for Federal support of educational programs, Congress has legislated for an accounting for these funds, not dollar-and-cents bookkeeping, but an accounting for efficacy of the funded program.

This measurement of efficacy, or evaluation, is an infant on the educational scene. It lacks an established body of knowledge appropriate to education, sufficient personnel with the necessary competencies and experience, and the techniques and skills to satisfy the legal requirements or needs of the Congress and education.[1]

A traditional view of evaluation is that it "....signifies describing something, in terms of selected attributes, and judging the degree of acceptability or suitability of that which has been described...(that is)...any aspect of the educational scene, but it is typically (a) a total school program, (b) a curricular procedure, or (c) an individual or group of individuals."[2] An explication of evaluation as required by Title I, ESEA, relates that "....to evaluate is to judge the worth, rate or value of something. Each decision that is made, each course of action that is chosen, even each word that is spoken follows an evaluation of at least one course of action. Evaluation has taken

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[1]Stufflebeam, D. L. "A Depth Study of the Evaluation Requirement." Theory into Practice, Columbus, Ohio. The Ohio State University College of Education. June 1966, p. 130.

[2]Hagen, Elizabeth P. and Thorndike, Robert L. "Evaluation." Encyclopedia of Educational Research. New York: The Macmillan Company, 1960, p. 482.

place anytime something is judged good or bad, better or worse, worth continuing or discontinuing. In education, evaluation provides a basis for making sound decisions about educational practice and procedures."[3] (it. mine)

These guidelines imply the use of evaluation to gather and interpret evidence in support of ingenuity and innovation in reaching educational objectives, such evidence leading to a practical decision, a judgment with the best evidence available. A further clue to the role of evaluation is that "....evaluation is part of the teaching process and should contribute information during the project period as well as at the end...(so that)...evaluative information may lead to changed methods, or changed objectives, or both."[4]

Title I outlines a complete cycle of educational experimentation and change, with an initial identification of deficiencies in local educational programs, followed by the development and demonstration of effective procedures to alleviate these deficiencies and improve local school practices. Findings of validated programs would then be disseminated.[5] Further testimony concerning the role of evaluation is given by Hastings, who states that "If...(we are)...to move toward the point of basing decisions...on educational purposes and outcome, we need far more evaluative data...than...in any instance to date." Hastings attributes two general purposes to evaluation: a) the collection of

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[3] Guide to Evaluation of Title I Projects. Washington, D. C., U. S. Office of Education, October 1966, pp. 2-3.

[4] Guidelines: Special Programs for Educationally Deprived Children: Elementary and Secondary Education Act of 1965/Title I, Section II, Design and Evaluation of Projects. Washington, D. C., U. S. Office of Education, 1965, p. 40.

[5] Guide to Evaluation of Title I Projects. Washington, D. C., U. S. Office of Education, October 1966, p. 5.

information to be used as feedback...for further revision of materials and methods and b) to provide information as input for decision-making..."[6]

The many faces of evaluation.--

It is evident that the query "What is evaluation?" will bring forth differing definitions and characterizations. What is not quite so apparent is that all of these definitions are characterizations of evaluation, or at least, components of evaluation. Thus, when Stake in an evaluation report speaks of distinguishing between antecedent, transaction, and outcome data[7]; Thomas and Kearney of "identifying target populations, and special educational needs"[8]; Cronbach of "uncovering durable relationships"[9]; the U. S. Office of "feedback" and "assessing the extent and direction of change"[10]; Mooney of letting teachers "...say what they see to do and would like to try...of recording and data gathering and communicating"[11]; and the others of the various roles and characterizations of evaluation cited earlier in this paper, they are all speaking of activities or components of evaluation that could be categorized in a model-taxonomy of evaluation. The CIPP Model.--To serve as a framework

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[6]Hastings, J. Thomas. "Curriculum Evaluation: The Why of Outcomes", Journal of Educational Measurement, Spring 1966, pp. 27-32.

[7]Stake, Robert E. "The Countenance of Educational Evaluation", Center for Instructional Research and Curriculum Evaluation, University of Illinois, February 1966. Mimeograph.

[8]Thomas, Alan J. and Kearney, C. Phillip. "An Analysis of the Guidelines", Theory into Practice, Columbus, Ohio: June 1966, pp. 105-109.

[9]Cronbach, R. J. "Course Improvement Through Evaluation." Teachers College Record, 64, 1963, 672-683.

[10]Guidelines, op cit.

[11]Mooney, Ross L. "Initiating a Project." Theory into Practice, Columbus, Ohio: College of Education, The Ohio State University, June 1966, pp. 139-143.

for a study of evaluation, the CIPP Model of evaluation developed at The Ohio State University Evaluation Center is not only useful, but representative of the logical flow of an evaluation effort. The components of the CIPP Model are Context, Input, Process, and Product evaluation.[12] By limiting the role of evaluation in this paper to its use in project innovations within the local education agency, the relationship of the model components to educational change becomes more apparent.[13]

Evaluation is a way of looking at the world, a means of organizing the realities--in short, an information management system which provides focus to the problems and successes at hand. Much of what evaluation can do for the school administrator or project director-manager has been done before. Few administrators jump into an innovation or change activity without some assessment of context--the extant situation. Educators usually give some thought to the strengths and weaknesses of alternative solution strategies, and through school visits, telephone calls and other informal means, keep "tabs" on "how the project is going." Similarly, it would not be surprising to find that the outcomes of the innovation are measured in some manner. However, it is not an exaggeration to describe these activities as being informal and non-systemized. If one were to list but some of the potential sources of information at the disposal of the administrator, (the school, home, community, parents, pupils, teachers, literature, program, and research) and the types of information that might be useful to the administrator (attitudes, achievement, socio-economic

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[12]Conceptualized by D. L. Stufflebeam, Director, The Ohio State University Evaluation Center.

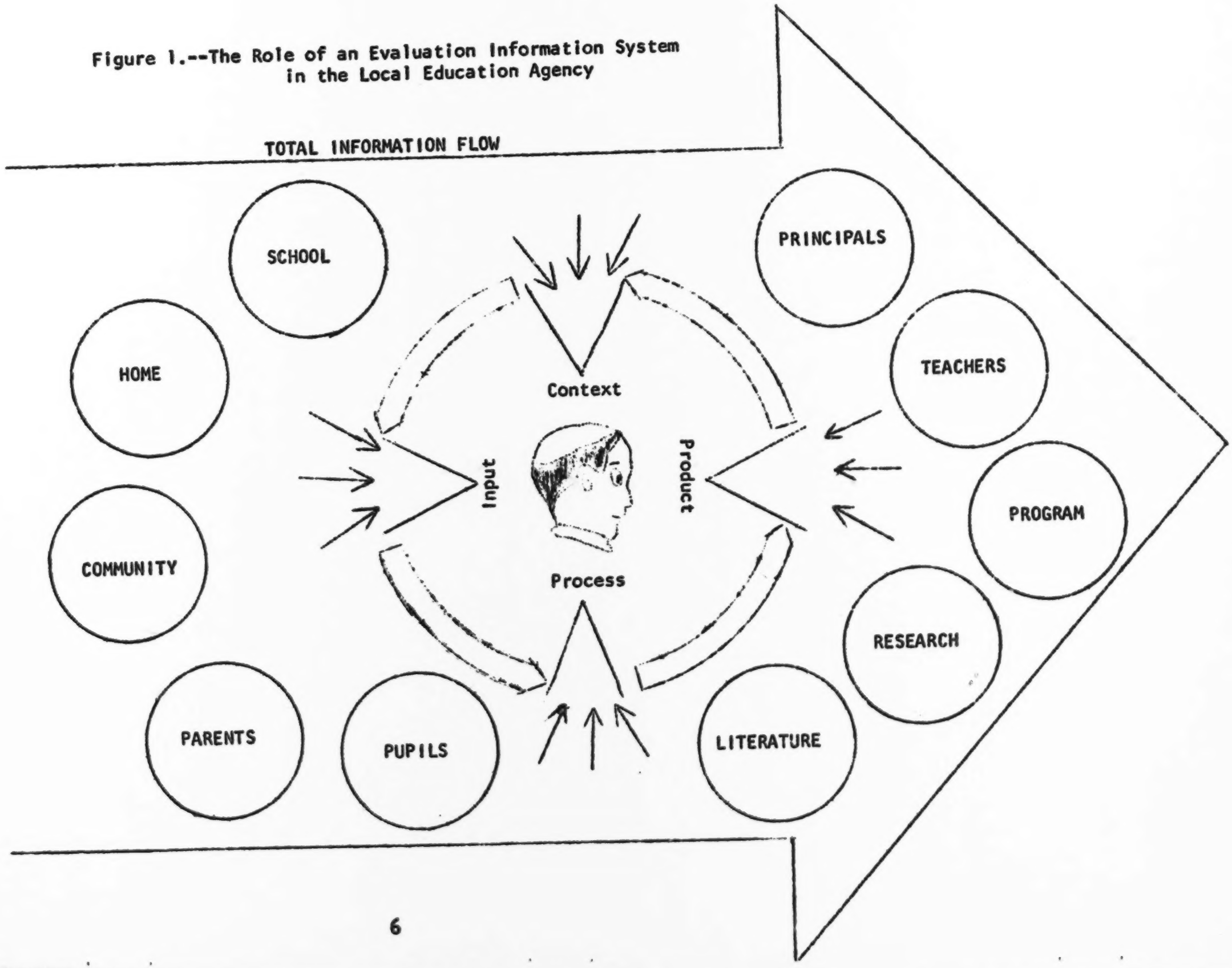
[13]For a discussion of evaluation at the local, state, and Federal levels, see (1) Stufflebeam, op cit.

status, and objectives) it would be apparent that the administrator would necessarily develop a system to handle the ensuing chaos. And so he does, by giving priority, for example, to 1) information gathered easily, 2) information acquired with least cost, and 3) information acquired with least clutter. But, in so doing, the administrator may lose, among others, 1) a broad base of information, 2) validity and reliability of the information acquired, and 3) source credibility. He is most likely losing more than he is gaining. As an analogy, can one picture the chief executive of a school system arriving at a school board meeting with a shoe box full of bills and another shoe box filled with requests for funds by teachers, principals, aids, etc.? No! He has established an accounting information system, with a budget for fund requests and a statement of expenditures, classified by categories, and certified as reliable and valid by a Certified Public Accountant!

Figure 1 depicts the flow of information with which the school administrator must deal, indicating some of the sources. The decision-maker, the central figure, would utilize the evaluation information system to provide a means of organizing his information to be representative of the appropriate sources, such as teachers, parents and pupils. He would utilize the approach or component (context, input, process, product) to ensure, among other criteria, timeliness, validity, and credibility of the information. He would develop an information system related to his information needs, from data collection through reporting.

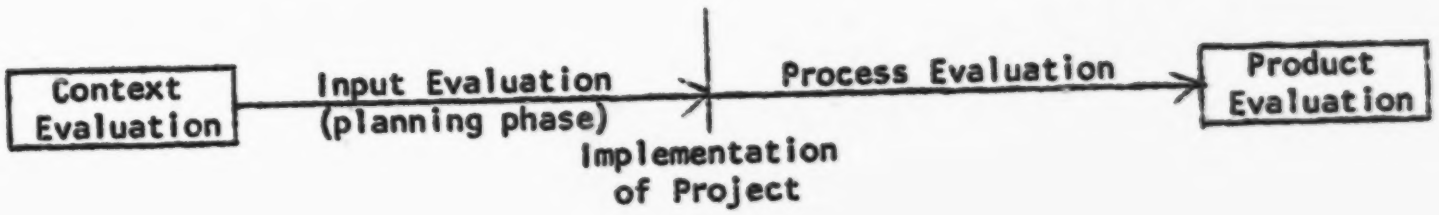
Thus, evaluation provides for the administrator a means of looking at, selecting and organizing the pertinent, relevant factors of the total information flow. A description of these processes and typical activities in an evaluation information system appears in Figure 2, page 9.

Figure 1.--The Role of an Evaluation Information System in the Local Education Agency



Evaluation--Systems Analysis.--

These components of evaluation may be further described in a look at evaluation in a linear sense:



Context evaluation, that is, identifying local educational program deficiencies, is a "snapshot" of pre-project achievement, aptitude, socio-economic data, attitudes, etc., similar to the balance sheet of a business establishment, reporting status at a point in time and space. It is akin to the preliminary phase of systems analysis, a limited systems study. Product evaluation, the measurement of outcomes as related to objectives, is a similar balance sheet, a static report. Contrasted to these two components are those of input (the assessment of potential solution strategies for their probability of effecting desired changes within the given constraints) and process evaluation (monitoring activities employed in implementing the planned change). These latter two, input and process, deal with the dynamic elements of the change activity.

It is important to establish the analogy of input and process evaluation with the discipline of systems analysis.

> "In the most general sense systems analysis and operations research can be characterized as the application of scientific methods and tools to the prediction and comparison of the values, effectiveness, and costs of a set of alternative courses of action involving man-machine systems... Systems studies trace out and assess the impact

> of a new policy on related activities in order to predict how effective the total set of interacting elements (a system) will be in performing its mission...viewing the new along with the old as a part of a set of things which function together.... System studies identify systems - limiting elements - a communication bottleneck, outdated information, or an inadequate source of supply."[14]

It is, then, not overly difficult to view evaluation as a specialized flow system, a system of information management for sound decision-making by educators. Lankton testifies to the need for evidence to be used in decision-making.[15] The U. S. Office of Education states that "...evaluation is part of the teaching process and should contribute information during the project period as well as at the end...(so that)...evaluative information may lead to changed methods, or changed objectives, or both. For instance, data on pupil attainment gathered around the midpoint of the project may show that the original objectives were unrealistic and should be scaled down."[16] Boerrigter indicates that Title I evaluation <u>should</u> provide information for improved administration and evidence of adequacy.[17] The static elements, <u>context</u> and <u>product</u> evaluation, are essentially of a measurement nature, while <u>input</u> and <u>process</u> are the prediction and monitoring of the potential and real interactions encompassed by the planned change.

A more detailed examination of the CIPP Model illustrates possible operational phases of the components of evaluation, and some of the potential

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[14]Meals, Donald W. "Heuristic Models for Systems Planning", <u>Phi Delta Kappan</u>, January 1967, pp. 199-203.

[15]Lankton, Robert S. "Closing the Gap Between Innovation and Evaluation", <u>NCME Newsletter</u>, Volume 10, Number 1, January 1967.

[16]<u>Guidelines</u>, <u>op cit</u>.

[17]Boerrigter, Glenn C. "Evaluation of Title I, Elementary and Secondary Act of 1965", mimeograph.

FIGURE 2.--The CI

Depicting Some Potential Activities

Phase / Component	Identification of Information Needs	Decision Rule Criteria	Information System Specifications	Data Co
CONTEXT To depict deficiencies in educational opportunities	Socio-economic status Current status Norms desired Mastery desired Cost-Effectiveness	Significant disparity between status and norms or desired mastery level	Source(s) Type of Information Time Requirements Criticality Sample Requirements Quantity Accessibility	Census Da Demograph Standardi Pupil Gra Pupil att Dropout D Attitude Opinionna Locally c tests
INPUT To acquire and assess alternative solution strategies	Available solutions to problem Data on prior trials Relationship to context	Feasibility Sufficiency Validity Viability Barriers Tensions Cost-Effectiveness	Source(s) Type of Information Time Requirements Criticality Sample Requirements Quantity Accessibility	Review of Interview personne communit parents, Pannels, s group me Transfer information Observati stration
PROCESS To monitor for .a priori barriers .unanticipated problems .progress	Barriers to success Interactive tensions Problem areas Progress benchmarks	Acceptability Utilization Integration Assimilation	Source(s) Type of Information Time Requirements Criticality Sample Requirements Quantity Accessibility	Logs Observati Interview Group Int Group deb Other ins .Attitude .Acceptan .Facilita Scale .Structur naire
PRODUCT To measure outcomes in relation to objectives	Project outcomes .achievement level .attitude .mastery .cost-effectiveness	Mastery level desired Achievement level desired Growth desired Attitude desired	Source(s) Type of Information Time Requirements Criticality Sample Requirements Quantity Accessibility	Standardi Pupil gra Attitude Attendanc Dropout R

PP EVALUATION MODEL

Within the Components of Evaluation

llection	Data Organization & Reduction	Data Storage and Retrieval	Data Analysis	Reporting
ta ic Study zed Tests des endance ata Survey ire onstructed	Manual Man-Machine .general programs .special programs	Data Bank Knowledge File Machine Manual	Statistical Analysis Content Analysis Depth Study Case Study	Formal Reports Written Tabular Informal Reports Oral-group Oral-one- to-one
literature s: LEA l, experts, y leaders, residents eminars, etings from other ion centers ons of demon- s	Manual Man-Machine .general programs .special programs	Data Bank Knowledge File Machine Manual	Statistical, Cost and Case Study Comparison of prior outcomes of alternatives Consultants for feasibility, barriers, tensions Force Field Analysis Educator jury for context, validity	Formal Reports Written Tabular Informal Reports Oral-group Oral-one- to-one
ons s erviews riefing truments: Scale ce Scale nt-Restraint ed Question-	Manual Man-Machine .general programs .special programs	Data Bank Knowledge File Machine Manual	Content Analysis Statistical Analysis	Formal Reports Written Tabular Informal Reports Oral-group Oral-one- to-one
zed tests des Scale e level ate	Manual Man-Machine .general programs .special programs	Data Bank Knowledge File Machine Manual	Statistical Analysis .pre-post .experimental- control Population Analysis Accounting	Tabular Statistical

techniques and/or methodology of each phase. It should be noted that these entries are not exhaustive of all techniques or methods. The information system phases for each component make up the horizontal rows of the chart, and are arranged sequentially from left to right.

Information systems for evaluation tend to be particularistic--designed for a specific information need. However, within a component, such as context, similar systems may be utilized for like information needs especially when source, sample requirements and criticality are congruent. Further, some systems may be reused, once designed, to provide continual or repeated information flow.

It is convenient to use a "typical" Title I-type problem and project to explicate the model in operation. In an examination of inner-city results from a battery of achievement tests, it is found that the mean scores of inner-city school children on a standardized math test are two and three years below grade level norm. Such a use of assessment procedures can be termed context evaluation. Math department personnel are then consulted, who present, from various sources, potential solutions to the problem, such as remedial techniques, curriculum changes, and changes in pupil-teacher relationships. These alternative solutions should be viewed in reference to the barriers to success, viability, sufficiency, economic costs, and other maximum-minimum variates. Input evaluation consists of viewing these alternative solutions in reference to barriers to success (i.e., acceptance of solution by teachers, students, etc.), viability (operation of the proposed solution(s) in a non-controlled field setting), sufficiency (ability of solution(s) to overcome the educational deficiency), economic costs (relationship of costs of proposed solutions to expected educational gains--that is, would a four-fold increase in costs which

only reduce the gap between ability and achievement by twice be "worth" the increase?) and other maximum-minimum variates. The cycle of postulating alternatives and data gathering-analysis, with a subsequent valuation of the alternative solution strategies, provides the necessary information for input evaluation and consequently, decision-making about which solution strategy shall be employed. Further, input evaluation identifies the potential problem areas and critical occurrences to be monitored during implementation of the solution. Thus, a process evaluation design might include monitoring of teacher acceptance of the solution strategy, materials utilization, real practices as related to desired behavior, as well as an on-going evaluation of the solution in meeting objectives sufficiently, or perhaps, viably. Process evaluation is the information management system for decision-making concerning the expansion, contraction, modification, clarification, termination, etc. of the solution strategy. Employment of process evaluation is invited interference, that is, the decision-makers wish to have information during the course of the project in order to modify plans toward a sufficient solution of the problem. The most effective use of process evaluation and utilization of the information in decision-making would ensure maximizing of outcomes, such as, in the case cited, the greatest possible closure of the achievement-ability gap.

The last component in the model, product evaluation, consists of the more traditional product measurement, relating outcomes to objectives. The variables tested are dependent upon objectives, such as closure in achievement-ability, improved attitude of students toward a subject matter area, improved school holding power, improved attendance rate--whatever variables can be reasonably expected to change through introduction of the change. Not to be overlooked

is the measurement of concomitant variates, which could be adversely affected, that is, increased time, interest and attention given by the student to the mathematics area may be deleterious to his reading achievement.

These are but some of the uses of the components of evaluation, and certainly the future will bring more ingenious and useful approaches and tools.

These needs and demands for evaluation, and the corresponding lack of theory, techniques and tools testify to the infancy of the art. Turnbull discussed the gap between innovation and evaluation,[18] Lankton related problems experienced in Title I evaluation,[19] and Guba, posing the question "How do the (evaluation sections of) Title III proposals...stack up?" responded "not very well." In his report to Miller, University of Kentucky, Guba makes recommendations concerning Title III evaluation which may well be appropriate for application to Title I evaluation. These are:

1. Spell out very carefully the objectives for the...program at the national level.
2. Provide adequate guidelines for the local proposer on the matter of evaluation.
3. Help the local proposer understand the meaning and utility of each of the four kinds of evaluation: Context, Input, Process and Product.[20]

It is not the purpose of this paper to suggest that evaluation, as herein conceptualized, is a new invention, nor to proffer evaluation as the panacea to the ills of education. Rather, it will provide a way in which to view the

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[18]Turnbull, Wm. W. Editorial, NCME Newsletter, Volume 9, Number 9, September 1966.

[19]Lankton, Robert S., op cit.

[20]Guba, Egon G. Study of Title III Activities: Report on Evaluation. National Institute for the Study of Educational Change, October 1, 1966.

complexities of innovating, and some tools and techniques with which to reduce these complexities to a more manageable form. Industry and the military have used such approaches, more familiarly termed "systems analysis". Proponents of the systems approach have suggested its applicability to education.[21] Though one most often thinks of assembly lines and chain-of-command when industrial and military systems are mentioned, the focus of systems analysis is to provide a means to handle the increasing complexity in decision-making and the choice among alternative solution strategies resulting from technological innovation and change.

Change can be local or global; evaluation can be microscopic or macroscopic, applied within the classroom, the school, a school system, and at the state or Federal level. The potential benefits of evaluation in decision-making to the educator must not be overlooked or denied through fear of a "Federal system" of education. As conceptualized, evaluation is neutral, it becomes good or bad only through application--or misapplication.

To summarize, evaluation is a tool of the decision-maker, a way of viewing planned educational change. The CIPP Model is a framework for evaluation of change, and a means of ensuring the efficacy of that change. It is, in short, a systems analysis approach to planned educational change; its purpose, to provide information for sound decision-making; its long-range benefits, to provide improved educational opportunities for youth.

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[21]Meals, Donald W., op cit.